

REMARKS

This paper is in response to the outstanding Office Action of June 4, 2004. The period for response extends to September 6, 2004. The Specification is amended to correct minor typographical errors noted during review thereof. The Claims have been amended to more particularly point out the salient features of the invention. No new matter has been entered. Support for the amendments come, for example, from page 5, lines 4-18, and page 7, lines 13-21 of the written description.

[1] Drawings

The informal drawings submitted with this application are under objection because of unclear handwriting in the Figures. It is noted that the objection will not be held in abeyance. Applicants have obtained formal drawings in compliance with the directive made in the outstanding action, which drawings are submitted herewith. Accordingly, Applicants respectfully request withdrawal of the objection to the drawings.

[2] Rejection of Claims 11-15 under 35 U.S.C. §102(e)

Claims 11-15 stand rejected under 35 U.S.C. §102(e) as being anticipated by U.S. Patent 6,412,051 to Konigsburg et al. (Konigsburg). Applicants respectfully traverse because the claims contain limitations not met by Konigsburg.

Claim 15 has been canceled thereby obviating the rejection with regard to claim 15.

Konigsburg discloses a memory cache wherein each entry in the tag array includes a validity bit which enables or disables the corresponding location in the data array based on whether it is functioning or not. This is distinguished from the claimed invention since, for example, claim 1 explicitly requires, inter alia, "said select means comprising a memory device separate from said tag arrays that stores a way select value for each said cache block" (emphasis added). Thus, claim 11 and the other independent claims 1 and 7 now explicitly require that the way select value be stored in a memory device separate from the tag arrays. Since claim 11 clearly defines over the cited prior art, Applicants respectfully request allowance thereof. Claims 12-14, 16, and 17 further define over the prior art, yet depend from claim 11 and are therefore allowable for the same reasons as claim 11.

[3] *Rejection of Claims 1, 3, and 7 under 35 U.S.C. §103(a)*

Claims 1, 3, and 7 stand rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent 6,671,822 to Asher et al. (Asher) in view of U.S. Patent 4,168,541 to DeKarske (DeKarske). Applicants respectfully traverse because the prior art fails to teach or suggest each and every limitation set forth in the claims. Specifically, Claims 1 requires disabling of the cache block “by passing a match signal from each tag array through a select device, said select device forcing said match signal to indicate a mismatch condition in response to a corresponding one of said way select values”. Claim 7 has a similar limitation.

Neither Asher nor DeKarske disclose this particular method of disabling a defective cache block. Asher teaches substituting a way for a different defective way using a plurality of multiplexers. See, e.g., the Abstract. DeKarske teaches disabling a block (subsection) of a way by setting the age bits to indicate that the disabled block is always the most recently used, and therefore never selected. See, e.g., col. 6, lines 34-39.

Applicants respectfully submit that, since claims 1 and 7 set forth limitations that distinguish from the cited prior art, claims 1 and 7 are allowable. Claim 3 further distinguishes the invention from the prior art of record, yet depends from claim 1 and is allowable for the same reasons as claim 1. Withdrawal of the outstanding rejection is respectfully requested.

[4] *Rejection of Claims 2, 4-6, and 8-10 under 35 U.S.C. §103(a)*

Claims 2, 4-6, and 8-10 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Asher and DeKarske in view of Konigsburg. Applicants respectfully traverse because, either the rejected claim has been canceled, or because not all claim limitations set forth in the claims are taught or suggested by the prior art.

Claims 2, 4, 8, and 9 have been canceled by the present amendment, thereby obviating any pending rejections. Applicants respectfully request withdrawal of rejections against these claims.

Claims 5, 6 and 10 are allowable for the same reasons discussed above with respect to claims 1 and 7. Konigsburg does not overcome deficiencies in Asher and DeKarske.

The Examiner cites Konigsburg for showing a way select value indicative of whether the corresponding cache block is defective. Applicants respectfully disagree. Specifically, the Examiner states that Konigsburg, “teaches a MESI field . . . for storing flags for indicating that a particular line has either been Modified, is Exclusive, is Shared, or is Invalid whereby the Invalid flag of MESI field 38 is used to inhibit access to a cache set, i.e., way, for which one or more failures have been determined.” Although semantically accurate, the statement by the Examiner belies a key difference between Konigsburg and the claimed invention. Specifically, the Invalid flag can be used to inhibit access to a cache set, but it is not indicative as to whether the corresponding cache block (as a whole) is defective, and it does not disable the cache block.

Konigsburg uses unfortunate and confusing language in stating that, “[t]he Invalid flag inhibits access to a cache set for which one or more failures have been determined” (col. 2, lines 59-62). This is because, since a MESI field is stored for each tag in the tag array, and since no provision is made for ensuring all the Invalidity bits in every MESI field in the entire array are set to the same value, the Invalidity bit does not serve to remove a defective block of cache from service -- only a small portion of it, and specifically, only a single data line in the cache.

In contrast, claim 1 requires, inter alia, “selectively disabling the way” (line 7). Claim 7 has a similar limitation. Konigsburg has no facility for disabling a way – only for preventing access to a particular way when the matching tag happens to have its Invalidity bit set. Unless the Invalidity flag for all tags of a corresponding tag array are set to Invalid, the way is not truly disabled.

Thus, Applicants disagree that Konigsburg discloses a way select value as the term would be understood by a person having ordinary skill in the art. Furthermore, Konigsburg does not disclose a value indicative of whether the corresponding cache block is defective.

Furthermore, Konigsburg does not teach a memory device separate from the tag arrays as now required in independent claims 1 and 7.

Claims 5, 6, and 10 further distinguish the invention from the prior art. However, since independent claims 1 and 7 are clearly distinguishable from the cited prior art, Applicants respectfully submit that dependent claims 5, 6, and 10 are also allowable.

[5] *Rejection of Claims 16 and 17 under 35 U.S.C. §103(a)*

Claims 16 and 17 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Konigsburg. Applicants respectfully traverse because not all claim limitations are met by the prior art. Except for the specific use of fuses and AND gates, the Office Action cites Konigsburg as substantially teaching the claimed invention. Applicants disagree for the reasons discussed above in the previous section. In addition, while Applicants acknowledge that fuses and AND gates were known in the prior art, they previously were not known for storing way select values or ANDing these values with a match signal as presently disclosed. Furthermore, there was no motivation that would have led a person to make the modification as suggested in the outstanding action. Konigsburg teaches storing an Invalidity bit as part of a MESI field in a tag array. The tag array is basically a block of specialized static or dynamic memory. The difficulties in inserting a fuse into the midst of this memory block would not have motivated a person having ordinary skill in the art to substitute the existing static or dynamic RAM element with a fuse. Likewise, since Konigsburg teaches using a bit stored in MESI field of the tag array to inhibit access to one of the cache blocks, the comparator 28 already used to compare the address information from the tag array 30 with the tag portion 24 of address 22 (col. 2, lines 41-45) would be much easier to implement than a separate AND gate. There would have been no motivation to separate out these processes and provide an AND gate in the context of Konigsburg.

Applicants therefore respectfully submit that, for the reasons cited above, and because claims 16 and 17 depend from claim 11 which is clearly distinguishable from the prior art, claims 16 and 17 are allowable.

Applicants respectfully submit that the present application is in condition for allowance. A Notice of Allowance is therefore respectfully requested.

If the Examiner has any questions concerning the present amendment, the Examiner is kindly requested to contact the undersigned at (408) 749-6900 x6933. If any other fees are due in connection with filing this amendment, the Commissioner is also authorized to charge

Deposit Account No. 50-0805 (Order No.SUNMP189). A duplicate copy of the transmittal is enclosed for this purpose.

Respectfully submitted,
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